CLAIMS

1. Shifting device for a multi-step transmission, in which at least one gearshift package (54, 54, 55) is allocated to two non-successive gear transmission ratio steps, in which each of these gearshift packages (54, 54, 55) is coupled through sliding selector shafts and/or gearshift cables with a gearshift lever (35), and which can be actuated by this, in which a shifting diagram is allocated to the gearshift lever (35), in which two successive gear transmission ratio steps are positioned essentially opposite each other in a gearshift path, in which the gear transmission ratio steps selectable within a gearshift path are allocated to different gearshift packages, and in which the gearshift lever (35) and the gearshift packages (53, 54, 55) are connected with a conversion device, by means of which a first gearshift lever movement in a gearshift path results in the taking out of the preceding gear (G1, G3, G5, G7) of a first gearshift package (53, 54, 55), whereas a second gearshift lever movement in the same gearshift path results in the insertion of a new gear (G2, G4, G6, RG) of a second gearshift package (53, 54, 55), whereby the conversion device is characterized in that the gearshift lever (35) is coupled with an axially displaceable shift finger shaft (1) which can be swiveled around its longitudinal axis, in that the shift finger shaft (1) respectively penetrates an opening of gearshift frames (14, 15, 16, 17) connected with sliding selector shafts (10, 11, 12, 13, 14, 56, 57, 58, 59), in that at the shift finger shaft (1) at least one shift finger (2, 3, 4, 5, 6, 7, 8) per gear transmission ratio step, or per gearshift frame (14, 15, 16, 17) is arranged, and in that each gearshift frame (14, 15, 16, 17) has at least one recess (9, 9a) in the area of its opening, to which at least one shift finger (2, 3, 4, 5, 6, 7, 8) is arranged.

2. Shifting device according to claim 1, characterized in that in an axial displacement of the shift finger shaft (1) for selecting a gearshift path, at least one shift finger (2, 3, 4, 5, 6, 7, 8) engages into one recess (9, 9a) of a gearshift frame (14, 15, 16, 17), and in that in a radial swiveling (19) of the shift finger shaft (1) around its longitudinal axis for putting in or taking out of a gear (GR, G1,

G2, G3, G4, G5, G6, G7) at least one shift finger (2, 3, 4, 5, 6, 7, 8) axially shifts the gearshift frame (14, 15, 16, 17).

3. Shifting device according to claim 1 or 2, characterized in that the opening and/or the outer geometry of the gearshift frame (14, 15, 16, 17) are realized essentially oval, circular, or rectangular.

4. Shifting device according to claim 3, characterized in that the sliding selector shafts (10, 11, 12, 13, 14, 56, 57, 58, 59) and the gearshift frame (14, 15, 16, 17) are built as common component, preferably as a metal cutting die.

5. Shifting device according to one or several of the preceding claims, characterized in that the sliding selector shafts (10, 11, 12, 13, 14, 56, 57, 58, 59) or the gearshift frame (14, 15, 16, 17) for actuating of the gearshift medium of the gearshift packages (53, 54, 55) are connected with gearshift forks, or gearshift rockers, which engage in sliding collars arranged axially displaceable and torsion-resistantly on gearshift shafts.

6. Shifting device according to one of the preceding claims, characterized in that two shift fingers are allocated to each gearshift frame (14, 15, 16, 17) on the shift finger shaft (1).

7. Shifting device according to claim 6, characterized in that the two shift fingers (2, 3, 4, 5, 6, 7, 8), allocated to each of the gearshift frames (14, 15, 16, 17), are positioned at the same location on the shift finger shaft (1), or axially behind each other in such a way, that the shift finger (2, 3, 4, 5, 6, 7, 8) point radially into the same, or in opposite direction.

8. Shifting device according to one of the preceding claims, characterized in that the gearshift frames (14, 15, 16, 17) with their sliding selector shafts (10, 11, 12, 13, 14, 56, 57, 58, 59) are in the conversion device for actuating the reverse gear (RG), and if needed, the seventh gear (G7), the first and third gear (G1, G3), the fourth and fifth gear (G4, G5), as well as the second and sixth gear (G2, G6), and are situated axially behind each other with respect to the shift finger shaft (1).

9. Shifting device according to one of the preceding claims, characterized in that the recesses (9, 9a) are located in the gearshift frames (14, 15, 16, 17), that they have a gearshift contour (22, 27) in the shifting direction with an

essentially radially aligned stop face, and in the opposite direction an essentially curved engine-to-body-clearance contour (20, 21).

10. Shifting device according to one of the preceding claims, characterized in that the shift fingers (2, 3, 4, 5, 6, 7, 8) are built in such a way, that n they have a gearshift contour (28) in shifting direction with an essentially radially aligned stop face, and in opposite direction an essentially curved, or at least beveled engine-to-body-clearance contour (29).

11. Shifting device according to one of the preceding claims, characterized in that there are recesses (23) at the shift fingers (2, 3, 4, 5, 6, 7, 8), and/or at the sites of the shift finger shaft (1) that correspond with the shift fingers, into which a locking medium (24) engages which releases a shifting action for a gear, while the other gears are locked.

12. Shifting device according to claim 11, characterized in that the locking medium (24) is a cam that is positioned at the gearshift frame (14, 15, 16, 17), and points to the shift finger path (1).

13. Shifting device according to claim 11, characterized in that the recesses (23) at the shift fingers (2, 3, 4, 5, 6, 7, 8), and/or at the shift finger shaft (1) have angular side walls.

14. Shifting device according to one of the preceding claims, characterized in that a shifting diagram is assigned to the gearshift lever (35), which is in the form of an "H", or a multiple "H".

15. Shifting device according to one of the preceding claims, characterized in that at least one shift finger (2, 3, 4, 5, 6, 7, 8) of the shift finger shaft (1) is taken out of an engaging position in the opening of a gearshift frame (14, 15, 16, 17), while at least one other shift finger (2, 3, 4, 5, 6, 7, 8) inserts itself into the opening of another gearshift frame (14, 15, 16, 17).

16. Shifting device according to one of the preceding claims, characterized in that the contour of the recess (9, 9a) of the gearshift frame (14, 15, 16, 17) is designed in such a way, that the power transmission ratio of the contactor is controlled by it.

17. Shifting device according to one of the preceding claims, characterized in that the contactor can be actuated manually, or through a power-assisted regulating device.

18. Shifting device according to claim 17, characterized in that the contactor is designed as a piston-cylinder-set-up.

19. Shifting device according to at least one preceding claims, characterized in that the shift fingers ((2, 3, 4, 5, 6, 7, 8) have different lengths for setting the respective gear-specific synchronous paths.

20. Shifting device according to one or several of the preceding claims, characterized in that the axial distance between two gearshift frames (60, 61) is at least one shift finger width (84), or three shift finger widths (84).

21. Shifting device according to one or several of the preceding claims, characterized in that the contour (71, 72, 73) of the gearshift frame (68) is designed in such a way, that it allows or generates a moveability (74) of the gearshift lever (35) in the gearshifting gate (36) in a change of the gearshift path, in which the gearshift lever (35) can be moved mainly diagonally in the selector path (75).

22. Shifting device according to one or several of the preceding claims, characterized in that the contour of the engagement area (82) of the shift finger (81) is created in such a way, that it allows or generates a moveability (74) of the gearshift lever (35) in the gearshifting gate (36) in a change of the gearshift path, in which the gearshift lever (35) can be moved mainly diagonally in the selector path (75).

23. Shifting device according to one or several of the preceding claims, characterized in that the width (83) of the engagement area (82) of the shift finger (81) is smaller than the width (83) of the shift finger (81) in the area of its hub, or opening (85).

24. Shifting device according to one or several of the preceding claims, characterized in that the shift fingers (2 to 8, 62, 65, 81) are arranged on the shift finger shaft (1) in such a way, that the shift fingers (2 to 8, 62, 65, 81) do not run

perpendicular to the sliding selector shafts (10 to 13, 56 to 59), or gearshift frames (14 to 17, 60, 61, 68) in the neutral position.

25. Shifting device according to claim 24, characterized in that for putting the transmission in a gear by moving the gearshift lever (35), the respective shift finger (2 to 8, 62, 65, 81) can be swiveled into a position, which is essentially arranged perpendicular to the sliding selector shaft (10 to 13, 56 to 59), or to the gearshift frame (14 to 17, 60, 61, 68).

26. Shifting device according to one of the claims 1 to 23, characterized in that a shift finger is provided for actuating a gearshift package, or for putting in or taking out of two gears, and acts together with a gearshift frame (e.g. gear five/six).

27. Shifting device according to claim 26, characterized in that the shift finger acts together with a recess (9) of a gearshift frame for actuating a gearshift package.

28. Shifting device according to one of the claims 26, or 27, characterized in that the shift finger is arranged on the shift finger shaft (1) for actuating a gearshift frame in such a way, that in neutral position, the shift finger essentially runs perpendicular to the sliding selector shaft, or to the gearshift frame.

29. Shifting device according to one of the claims 26, 27, or 28, characterized in that for putting the transmission in a gear by using the gearshift lever, the shift finger can be swiveled into a position, which is essentially not perpendicularly located to the sliding selector shaft, or to the gearshift frame.

30. Shifting device according to one of the claims 26 to 29, characterized in that four gears can be shifted with two shift fingers.

31. Shifting device according to claim 11, characterized in that the recesses essentially are provided as hubs in circumferential direction on the shift finger shaft, whereby the hubs extend at least over a section of the circumference.

32. Shifting device according to claim 21 and/or 22, characterized in that the course of motion (74) of a gearshift lever (35) can be preset by the geometry of the gearshift frames and/or catch stops, so that the function of a gate for a manual gearshift lever can be represented by gearshift frames and/or catch stops.

33. Shifting device according to claim 32, characterized in that the gearshift lever (35) when changing a gear in a gearshift path to an adjacent gear in another gearshift path, performs an essentially diagonal path in the selector path (75, 79, 80).

34. Motor vehicle transmission according to at least one of the preceding claims, characterized in that it contains a shifting device with at least one characteristic of the claims 1 to 33.

35. Motor vehicle transmission according to claim 34, characterized in that it exclusively contains loose wheels, whose respectively gearshift packages for their torsion-resistant connection are allocated to one gearshift shaft each.

36. Motor vehicle transmission according to claim 34 or 35, characterized in that it is constructed as a double clutch transmission.

37. Motor vehicle transmission according to claim 34 or 35, characterized in that it contains a double clutch gearset with only one start clutch (32).